Arctic Mixed-Phase Cloud Dissipation and its Relationship to Low CCN Concentrations

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Overview

Can a lack of environmental CCN/aerosol be a primary factor for Arctic cloud dissipation?

- Persistent mixed-phase boundary layer clouds are important regulators for Arctic (and global) climate.
- Accurately modeling Arctic clouds are important to properly simulate the global climate system.
- Unlike in lower latitudes, Arctic aerosol concentrations have been hypothesized to be low enough to inhibit cloud formation
  - Mauritsen et al. (2011) coined the term "tenuous clouds" in which cloud structure was limited by aerosol concentration

Cases and Simulation Setup

Data from the ASCOS field campaign and from the DOE ARM site at Oliktok Point, Alaska, analysed to find cases of potential aerosol-limited cloud dissipation.
Two potential cases have been identified:

- Oliktok Point - May 12th, 2017
  - Northern slope of Alaska - ocean/land boundary
- ASCOS - August 31st, 2008
  - Arctic ocean ice floe

The plots below show radar reflectivity (a) and aerosol concentration (b).